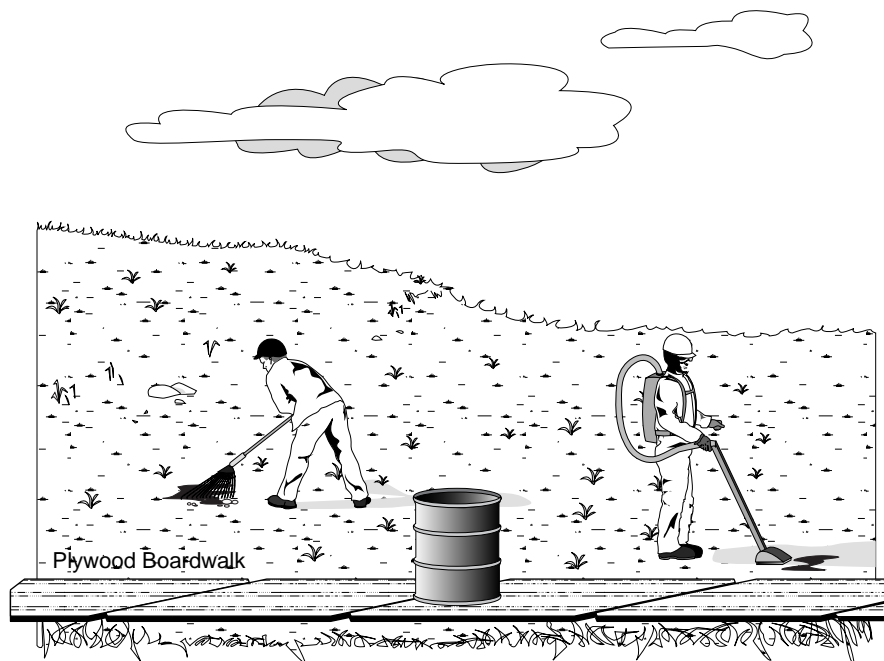


Manual Removal



Manual removal of spill residue may involve collecting spilled substances or contaminated debris by hand or with rakes, mops, pitchforks, trowels, shovels, buckets, portable vacuum systems, sorbent materials (Tactic T-4), and the like. Contaminated material can be placed directly in plastic bags or drums for transfer. If the containers are to be carried to temporary storage areas they should not weigh more than can be safely carried by one person.

A rubber squeegee (or other similar equipment) can be used to gently compress and agitate the tundra surface to squeeze contaminants out of pore spaces of the organic layer. Compression and agitation may be used in conjunction with flooding (Tactic T-1) or flushing (Tactic T-2) to enhance removal of spill residue.

During manual removal activities, avoid damaging plant roots and uncontaminated plants. The potential for physical damage to the tundra while using these labor-intensive techniques must be carefully weighed against the benefits of removing the spill residual.

APPLICABILITY

	APPLICABILITY	COMMENTS
SPIILLED SUBSTANCE	Crude oil, diesel, glycol, methanol	<ul style="list-style-type: none"> Not useful for spills of saline substances such as seawater.
TUNDRA TYPE	All	<ul style="list-style-type: none"> Dry tundra is more susceptible to physical damage than wet or moist tundra.
SEASON	All	<ul style="list-style-type: none"> Physical damage may be minimized when ground is frozen.

CONSIDERATIONS AND LIMITATIONS

- Take proper precautions to protect any type of tundra from foot/vehicle traffic (Tactic P-4).
- Not useful for spills of saline substances such as seawater.
- This tactic has been adapted from Tactics R-2 and SH-2 in the *Alaska Clean Seas Technical Manual* (Alaska Clean Seas, 1999, Vol. 1). Equipment such as mops or squeegees to swab, agitate, or compress the tundra surface to help remove crude oil from pore spaces has been used successfully on wet and moist tundra on the North Slope (Cater and Jorgenson, 1995). Information on the effectiveness of this tactic is based on field observations, not controlled experiments. No test data exist which document whether the use of this tactic results in long-term benefits to tundra restoration compared with other tactics, combinations of tactics, or “no action.”

EQUIPMENT, MATERIALS, AND PERSONNEL

- Rakes (1 worker) – recovery
- Mop (1 worker) – recovery
- Squeegee (1 worker) – agitation
- Hand-carried vacuum unit (1 worker) – recovery